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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/553,735	04/20/2000	Kishan Shenoi	9548-770	5543

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EXAMINER	
BAYARD, EMMANUEL	
ART UNIT	**PAPER NUMBER**
2631	

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/553,735	SHENOI, KISHAN
	Examiner	Art Unit
	Emmanuel Bayard	2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 October 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,9,10,12,14-16,18,20,21,23-31,33-40 and 42-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,9,10,12,14-16,18,20,21,23-31,33-40 and 42-62* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-7, 9-10, 12, 14-16, 18, 20-21, 23-31, 33-40 and 42-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naden et al U.S. Patent No 5,999,561 in view of Higuchi et al U.S. Patent No 6,167,037.

As per claims 1 and 23, Naden et al discloses a method for tracking CDMA pilot channel signal to discipline an oscillator comprising: down converting an RF signal from a center frequency Fr to an intermediate center frequency FI (see figs. 9, 11 element 1104 and col.16, lines 45-46 and col.20, lines 9-111) where fI is greater than or equal to a CDMA chip rate Fc wherein down converting includes incorporated band pass filtering (see col.110, lines 59-63 and col.111, lines 33-35 and col.112, lines 7-13 and col.119, lines 23-27) to remove extraneous signals while passing said CDMA pilot channel signal; converting a signal format from analog to digital using a single analog to digital converter (see figs. 9, 11 element 907 and col.16, line 47) employing a sampling rate of Fs to create a signal sampling signal Sn; employing correlation circuit (see figs.9, 11 element 911 and col.16, lines 65-67 and col.17, lines 21, 30-32 and col.20, lines 18-20) to establish a correlation between the Sn locally generated versions of I-channel and Q channel PN signals respectively; generating an estimating of an error generating an

estimating of a frequency error (see col.10, lines 15-16, 43-55 and col.30, lines 58-60) of the oscillator using correlation values corresponding to (2M + 1) time shifts where a time shift of K corresponds to a time shift that provides the maximum correlation value (see col.32, lines 60-65 and col.33, lines 53-67)and M is greater or equal to 1.

However Naden et al does not teach wherein correlation values between the digital signal and at least one locally generated version of I-channel and Q-channel PN signals are averaged over multiple periods of the PN signals.

Higuchi teaches correlation values are averaged over plurality of intervals of long codes is the same as the claimed (wherein correlation values between the digital signal and at least one locally generated version of I-channel and Q-channel PN signals are averaged over multiple periods of the PN signals) (see fig.26 col.14, lines 1-13 and col.16, lines 45-55).

It would have been obvious tone of ordinary skill in the art the implement the teaching of Higuchi into Naden as to detect the timing of the maximum squared sum of the initial phase of the long code as recited by Higuchi (see col.14, lines 10-13).

As per claims 2-4, the method of Naden et al does include a sampling rate, Fs, an intermediate center frequency, fI, and a chip rate, fc (see col.110, lines 59-63 and col.111, lines 33-35 and col.112, lines 7-13 and col.119, lines 23-27).

As per claim 5, the method of Naden et al does include a single accumulator for generating both real and imaginary (see col.61, lines 25, 49).

As per claim 6, the method of Naden et al does include monitoring of both positive overflows and negative overflows (see col.60, lines 63-67 and col.61, lines 1-20).

As per claim 7, the method of the method of Naden et al does include correlation process instead of matched filter (see fig.9 element 911).

As per claims 9-10 and 13, the method of the method of Naden would include the correlation computation of time shift lags as to detect the timing of the maximum squared sum of the initial phase of the long code as recited by Higuchi (see col.14, lines 10-13).

As per claim 12, the method of the method of Naden et al would include background correlation as to detect the timing of the maximum squared sum of the initial phase of the long code as recited by Higuchi (see col.14, lines 10-13).

As per claim 14, Naden et al discloses an apparatus to track a pilot signal, comprising: a correlator circuit adapted to compute a complex correlation between a received version of the pilot signal and locally generated versions of I-channel and Q-channel PN signals, respectively (see figs 9, 11 element 911 and col.16, lines 64-67 and col.17, lines 1-44 and col.20, lines 18-25); a signal processor circuit coupled to the correlator circuit (see fig.9 element 921 and col.17, lines 10-21).

However Naden et al does not teach wherein the signal processor circuit averages correlation values over multiple periods of the PN signals.

Higuchi teaches correlation values are averaged over plurality of intervals of long codes is the same as the claimed (correlation values are averaged over multiple periods of the PN signals) (see col.14, lines 1-13).

It would have been obvious tone of ordinary skill in the art the implement the teaching of Higuchi into Naden as to detect the timing of the maximum squared sum of the initial phase of the long code as recited by Higuchi (see col.14, lines 10-13).

As per claim 15, the apparatus of Naden et al does include a buffer (see col.40, line 45). Note that a FPGA is known in the art as buffering device or a storage device. Therefore the buffer of Naden et al is considered as a FPGA.

As per claim 16, the method of Naden et al does include a single accumulator for generating both real and imaginary (see col.61, lines 25, 49).

As per claims 17-18, the method of Naden et al does include a signal processor having a DSP (see col.45, line 37).

As per claim 19, the method of Naden et al does include a signal processor for averaging correlations values (col.16, lines 64-67 and col.17, lines 1-44 and col.20, lines 18-25).

As per claim 20, the method of Naden et al would include parallel correlator as to detect the timing of receiving the initial phase of each long code from the detection timings of the correlation peaks at uneven intervals.

As per claim 21, the method of Naden et al would include a background correlation as to detect the timing of the maximum squared sum of the initial phase of the long code as recited by Higuchi (see col.14, lines 10-13).

As per claims 24 and 34, Naden et al discloses a method for tracking a pilot channel comprising: disciplining an oscillator (see figs.9, 11, 32 elements 927, 1110, 3250 and col.45, line 43 and col.46, line 65) including generating a spectrum shaped channel pilot signal (see col.1, line 16 and col.13, line 61) Y(n) from a chip-rate PN sequence by: over sampling (see col.28, lines 40-45 and col.49, lines 1-8 and col.55, lines 32-35); passing A(n) through a first FIR filter (see fig. 11 element 1116I and col.31, lines 1-3 and col.51, lines 11-15) whose impulse response coefficients are G(n) to yield a signal B(n); filtering B(n) with a second filter (see fig. 11 element 1116Q and col.31, lines 1-3 and col.51, lines 11-15) to yield the spectrum shaped channel pilot Y(n).

However Naden et al does not teach wherein correlation values are averaged over multiple periods of the PN signals.

Higuchi teaches correlation values are averaged over plurality of intervals of long codes is the same as the claimed (correlation values are averaged over multiple periods of the PN signals) (see col.14, lines 1-13).

As per claims 25, 27, the method of Naden et al does include I channel (see fig.11 element 1116I).

As per claim 26, the method of Naden et al does include monitoring of both positive overflows and negative overflows (see col.60, lines 63-67 and col.61, lines 1-20)

As per claim 28, the method of Naden et al does include base band signal (see col.16, line 50)).

As per claim 29, the method of Naden et al does include VXCO that is a phase locked to a reference frequency (see fig.9).

As per claim 30, the method of Naden et al does include a correlation (fig.9 element 911).

As per claim 31, the method of Naden et al would include a matched filter as to eliminate noise in the initial phase of the receiving signal.

As per claim 33, the method of Naden et al does include I channel pilot (see fig.11 element 1116I).

As per claim 35, the method of Naden et al does include a FPGA (see col.40, line 45).

As per claims 36-37, the method of Naden et al does include a signal processor having a DSP (see col.45, line 37).

As per claim 38, the method of Naden et al does include an A/D converter (see fig.9 element 907).

As per claim 39, the method of Naden et al would include a 4-point FIR filter as to eliminate noise in the initial phase of the receiving signal.

As per claim 40, the method of Naden et al would include a 4-point FIR filter therefore a 48-point FIR filter as to eliminate noise in the initial phase of the receiving signal.

As per claim 42, the method of Naden et al would include a background correlator as to detect the timing of the maximum squared sum of the initial phase of the long code as recited by Higuchi (see col.14, lines 10-13).

As per claims 43, 53, 55-58 Naden would include an apparatus operated in parallel to track multiple pilots as to detect the timing of the maximum squared sum of the initial phase of the long code.

As per claims 44-47, Naden and Higuchi in combination would include an averaging CMS as to detect the timing of the maximum squared sum of the initial phase of the long code as recited by Higuchi (see col.14, lines 10-13).

As per claims 48-52, Naden and Higuchi in combination would include an offset synthesizer to improve precision of an estimate of time arrival of received signal as to detect the timing of the maximum squared sum of the initial phase of the long code as recited by Higuchi (see col.14, lines 10-13).

As per claim 54, Naden does include an oscillator (see fig.32 element 3250 and col.45, lines 43-45). Furthermore implementing such oscillation to track multiple pilots would have been obvious to one skilled in the art as to detect the timing of the maximum squared sum of the initial phase of the long code.

As per 59-60 and 62, Naden does include different I and Q PN Channels (see fig.9 and col.9, lines 46-48 and col.20, lines 15-23).

As per claim 61, Naden does include an oscillator (see fig.32 element 3250 and col.45, lines 43-45). Furthermore implementing such oscillation to generate another spectrum shaped channel pilot would have been obvious to one skill in the art as to detect the timing of the maximum squared sum of the initial phase of the long code.

Claims 1,14, 23-24, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naden et al U.S. Patent No 5,999,561 in view of Schoolcraft U.S. Patent No 5,237,587.

As per claims 1 and 23, Naden et al discloses a method for tracking CDMA pilot channel signal to discipline an oscillator comprising: down converting an RF signal from a center frequency Fr to an intermediate center frequency FI (see figs. 9, 11 element 1104 and col.16, lines 45-46 and col.20, lines 9-111) where fl is greater than or equal to a CDMA chip rate Fc wherein down converting includes incorporated band pass filtering (see col.110, lines 59-63 and col.111, lines 33-35 and col.112, lines 7-13 and col.119, lines 23-27) to remove extraneous signals while passing said CDMA pilot channel signal; converting a signal format from analog to digital using a single analog to digital converter (see figs. 9, 11 element 907 and col.16, line 47) employing a sampling rate of Fs to create a signal sampling signal Sn; employing correlation circuit (see figs.9, 11 element 911 and col.16, lines 65-67 and col.17, lines 21, 30-32 and col.20, lines 18-20) to establish a correlation between the Sn locally generated versions of I-channel and Q channel PN signals respectively; generating an estimating of an error generating an estimating of a frequency error (see col.10, lines 15-16, 43-55 and col.30, lines 58-60) of the oscillator using correlation values corresponding to (2M + 1) time shifts where a time shift of K corresponds to a time shift that provides the maximum correlation value (see col.32, lines 60-65 and col.33, lines 53-67)and M is greater or equal to 1.

However Naden et al does not teach wherein correlation values between the digital signal and at least one locally generated version of I-channel and Q-channel PN signals are averaged over multiple periods of the PN signals.

Schoocraft teaches wherein correlation values between the digital signal and at least one locally generated version of I-channel and Q-channel PN signals are averaged over multiple periods of the PN signals (see col.4, lines 10-45).

It would have been obvious tone of ordinary skill in the art the implement the teaching of Schoolcraft into Naden as to improve quality and continuity of the received data as recited by Schoolcraft (see col.4, lines 36-37).

As per claim 14, Naden et al discloses an apparatus to track a pilot signal, comprising: a correlator circuit adapted to compute a complex correlation between a received version of the pilot signal and locally generated versions of I-channel and Q-channel PN signals, respectively (see figs 9, 11 element 911 and col.16, lines 64-67 and col.17, lines 1-44 and col.20, lines 18-25); a signal processor circuit coupled to the correlator circuit (see fig.9 element 921 and col.17, lines 10-21).

However Naden et al does not teach wherein the signal processor circuit averages correlation values between the digital signal and at least one locally generated version of I-channel and Q-channel PN signals are averaged over multiple periods of the PN signals (see col.4, lines 10-45).

Schoolcraft teaches averages correlation values between the digital signal and at least one locally generated version of I-channel and Q-channel PN signals are averaged over multiple periods of the PN signals (see col.4, lines 10-45).

It would have been obvious tone of ordinary skill in the art the implement the teaching of Schoolcraft into Naden as to improve quality and continuity of the received data as recited by Schoolcraft (see col.4, lines 36-37).

As per claims 24 and 34, Naden et al discloses a method for tracking a pilot channel comprising: disciplining an oscillator (see figs.9, 11, 32 elements 927, 1110, 3250 and col.45, line 43 and col.46, line 65) including generating a spectrum shaped channel pilot signal (see col.1, line 16 and col.13, line 61) Y(n) from a chip-rate PN sequence by: over sampling (see col.28, lines 40-45 and col.49, lines 1-8 and col.55, lines 32-35); passing A(n) through a first FIR filter (see fig. 11 element 1116I and col.31, lines 1-3 and col.51, lines 11-15) whose impulse response coefficients are G(n) to yield a signal B(n); filtering B(n) with a second filter (see fig. 11 element 1116Q and col.31, lines 1-3 and col.51, lines 11-15) to yield the spectrum shaped channel pilot Y(n).

However Naden et al does not teach averaging correlation values between the digital signal and at least one locally generated version of I-channel and Q-channel PN signals are averaged over multiple periods of the PN signals (see col.4, lines 10-45).

Schoolcraft teaches averaging correlation values between the digital signal and at least one locally generated version of I-channel and Q-channel PN signals are averaged over multiple periods of the PN signals (see col.4, lines 10-45).

It would have been obvious tone of ordinary skill in the art the implement the teaching of Schoolcraft into Naden as to improve quality and continuity of the received data as recited by Schoolcraft (see col.4, lines 36-37).

Conclusion

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shou et al U.S. patent No 6,038,250 teaches an initial synchronization method. (*)

Taipale U.S. patent No 6,310,856 B1 teaches a CDMA communication system.

Suzuki et al U.S. patent No 6,507,576 B1 teaches a code division.

Slonneger et al U.S. patent No 5,689,526 teaches a method and apparatus for synchronizing a plurality of CDMA signals. (*)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is 571 272 3016. The examiner can normally be reached on Monday-Friday (3:PM-10:PM) Alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Emmanuel Bayard
Primary Examiner
Art Unit 2631

12/22/04

EMMANUEL BAYARD